

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-108555

(43)Date of publication of application : 25.04.1995

(51)Int.Cl.

B29C 44/00
// B29K105:04

(21)Application number : 05-279020

(71)Applicant : NIPPON G II PLAST KK
SEKISUI PLASTICS CO LTD

(22)Date of filing : 12.10.1993

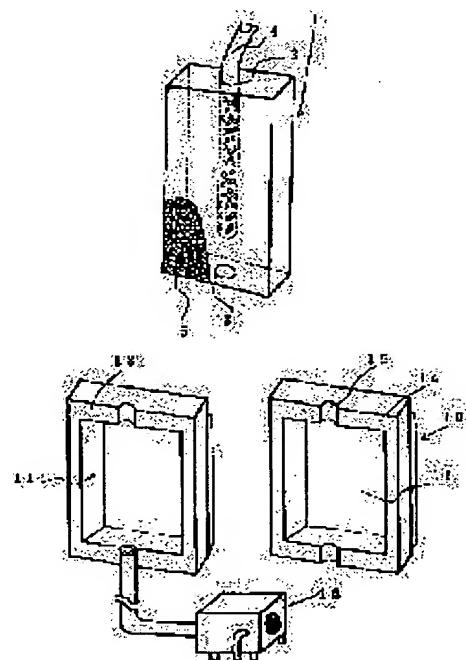
(72)Inventor : MORIOKA KIYOSHI
KUMAGAI KATSUHISA
ANDO MOTONARI
HARAO MASARU
EGUCHI TATSUYA
TAKAMATSU HIDEO

(54) MOLDING REINFORCED WITH FOAM AND ITS MANUFACTURE

(57)Abstract:

PURPOSE: To improve the rigidity of a molding without impairing its surface smoothness by introducing a vapor ejection tubular form into a hollow molding of highly heat-resistant thermoplastic resin, then placing it in a fixture with an internal shape equal to the outer shape of the molding after filling the hollow molding with a foaming resin particle with the same heat resistance, and causing the resin particle to adhere airtightly to the molding and foam.

CONSTITUTION: A hollow molding 1 is formed by a blow molding method using a thermoplastic resin with a Vicat softening point of at least, 100° C, and opening 2, 3 are formed. Next, a tubular form 4 such as a heat-resistant tube with tiny pores for vapor ejection is introduced into the opening 2, then the molding 1 is filled with a foaming resin particle 5 with a softening point of at least, 100° C and the molding is stored in a fixture 10. The fixture 10 has hollow parts 11, 12 which correspond to a die cavity for forming the molding 1, and also has an opening which corresponds to the tubular form 4 and the opening 3. After that, vapor is allowed to spew out of the election hole of the tubular form 4 to cause the resin particle 5 to foam, and thus the vapor and condensate are discharged from the opening 3. Consequently, the hollow molding 1 is prevented from becoming abnormally deformed.



LEGAL STATUS

[Date of request for examination]

23.06.1999

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number] 3413257

[Date of registration] 28.03.2003

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1] Inside a centrum part, from opening formed in the end part of the blow molding object by the thermoplastics which has the thermal resistance of 100 degrees C or more After being filled up with the fizz thermoplastics grain which has the thermal resistance of 100 degrees C or more as well as [insert the tubular object with which the stoma for steamy jet was formed, and] a part for the centrum of said blow molding object, It stores in the fixture which has a internal structure equivalent to the appearance of this blow molding object, and has two or more openings. The manufacture approach of the mold goods characterized by carrying out adhesion foaming of said fizz thermoplastics grain with which it filled up, emitting the steam and the water of condensation which are discharged from opening which introduced the steam in the Plastic solid through said tubular object, and was formed near the other end of a blow molding object out of a fixture.

[Claim 2] The manufacture approach of the mold goods according to claim 1 characterized by inserting it beforehand before filling up the tubular object with which the stoma of said large number was formed with the fizz thermoplastics grain which is an elastic heat-resistant tube and has said thermal resistance of 100 degrees C or more.

[Claim 3] The manufacture approach of the mold goods according to claim 1 characterized by being introduced after the tubular object with which the stoma of said large number was formed is filled up with the fizz thermoplastics grain which is a hard heat-resistant tube and has said thermal resistance of 100 degrees C or more.

[Claim 4] Mold goods characterized by carrying out adhesion foaming until it fills up a part for the centrum of the blow molding object which consists of thermoplastics which has the thermal resistance of 100 degrees C or more with the fizz thermoplastics grain which similarly has the thermal resistance of 100 degrees C or more and touches the wall of said blow molding object in this resin grain.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the approach for manufacturing the mold goods which made the rigidity of the blow molding object by the thermoplastics which has the thermal resistance of 100 degrees C or more improve, and these mold goods. The thermoplastics which has the thermal resistance of 100 degrees C or more here means that whose BIKATTO softening temperature of base material resin is 100 degrees C or more.

[0002] The front panel of large-sized components, such as resin mold goods like the shape of the shape of a board which needs rigidity comparatively large-sized and high as such a field of the invention, and a panel, for example, the sheet back panel for automobiles, a rear parcel shelf, and a side skirt board, a business machine, and home electronics, side panels, unit building materials, furniture, etc. are raised.

[0003]

[Description of the Prior Art] As an approach of raising the rigidity of the blow molding object used conventionally, the method of putting rib structure into mold goods in a shaping phase or the method of pouring an urethane foaming article into the interior of shaping backward is raised.

[0004] When especially the method of putting rib structure into a blow molding article uses blow molding, a design, a configuration, etc. have much constraint, and the location of rib structure is limited, and there are troubles, like the effectiveness is small in the part which separated the part near rib structure from this although rigidity was acquired.

[0005] Furthermore, on the front face for the rib structured division, a flat surface is difficult to get, and the fault which is easy to start gloss nonuniformity into a rib structure circumference part also has it.

[0006] In order that the method of pouring in an urethane foaming article may pour an urethane foaming article into the interior of a blow molding object, there is the rigid improvement effectiveness of a Plastic solid. However, since urethane resin is thermosetting resin, there is a fault from which recycle processing of collecting after use, carrying out melting and carrying out a shaping reuse becomes difficult.

[0007] Moreover, the foaming approach to which it is made to foam inside a blow molding object conventionally, heat-resistant low thermoplastics, for example, polystyrene resin particle, is learned, and the applicable product might be used. In this case, if it was when thermoplastics with low foaming temperature was used, it was possible by pouring a fizz resin particle (bead) into a centrum, for example, and blowing the usual steam here to have made it foam comparatively easily.

[0008] However, when it is inferior to thermal resistance, for example, performs baking finish, there is a fault which produces heat deformation. Furthermore, when recycle nature is also taken into consideration, it is desirable that it is a foaming article homogeneous as an envelope part. When making such heat-resistant high thermoplastics foam, it is necessary to raise also whenever [stoving temperature] enough, and the foaming means concerning the conventional technique cannot be used as it is.

[0009]

[Problem(s) to be Solved by the Invention] Let it be a technical problem to offer the product

manufactured by the manufacture approach of the mold goods reinforced by high foam of this invention having canceled the fault of the above conventional techniques, and having given the rigid improvement effectiveness by the homogeneous interior material of thermoplastics, and moreover having excelled in recycle nature, without sacrificing surface smoothness of the blow molding article by heat-resistant high thermoplastics, and such approach.

[0010]

[Means for Solving the Problem] The technical problem of this invention inside a centrum part from opening formed in the end part of a blow molding object with the thermoplastics which has the thermal resistance of 100 degrees C or more After being filled up with the fizz thermoplastics grain which has the thermal resistance of 100 degrees C or more as well as [insert the tubular object with which the stoma for steamy jet was formed, and] a part for the centrum of said blow molding object, It stores in the fixture which has a internal structure equivalent to the appearance of this blow molding object, and has two or more openings. It is solved by the manufacture approach of mold goods of carrying out adhesion foaming of said fizz thermoplastics grain with which it filled up, emitting the steam and the water of condensation which are discharged from opening which introduced the steam in the Plastic solid through said tubular object, and was formed near the other end of a blow molding object out of a fixture.

[0011] In this invention, the polyphenylene ether system resin which denaturalized with styrene resin as heat resistant resin for blow molding used for the blow molding articles (for example, the front panel of large-sized components, such as a sheet back panel for automobiles, a rear parcel shelf, and a side skirt board, and a business machine, a side panel, etc.) with which the thermal resistance which is the field of the invention, and rigidity are demanded is used.

[0012] Furthermore, in order to raise the rigidity of the blow molding article, the technical problem of this invention fabricates a blow molding article with the thermoplastics which has the thermal resistance of 100 degrees C or more, and is solved with the mold goods which carry out adhesion foaming of the fizz thermoplastics grain which has the thermal resistance of 100 degrees C or more inside this blow molding article.

[0013] As a fizz thermoplastics grain of high thermal resistance used here, if recycle nature is also taken into consideration, thermoplastics homogeneous as the blow molding article which forms an envelope is desirable, for example, can consider as fizz thermoplastics grains, such as polyphenylene ether system resin which denaturalized with styrene resin. Expandable beads, such as other resin, for example, a polypropylene resin etc., can also be used. In addition, the both sides of the fizz thermoplastics particle which sank in the particle and foaming agent which were obtained by carrying out pre-expansion of the fizz thermoplastics particle which sank in the foaming agent to a fizz thermoplastics grain are included.

[0014]

[Function of the Invention] before filling up with and shaving the fizz thermoplastics grain by which conversion be carried out according to the volume and the expansion ratio to wish for a centrum of mold goods through the 1st opening formed near the end section of the blow molding article beforehand fabricated by the predetermined dimension and the external configuration , according to this invention , the tubular object with which the stoma for steamy jet be prepared be insert after that . The fill of a fizz thermoplastics grain takes into consideration **** of the foaming agent you are made to include by the thermoplastics grain, final expansion ratio, etc., and is determined. Then, a steam is introduced from the tubular object which is inserted from the 1st opening and with which many stomata were formed, and the thermoplastics grain inside a Plastic solid is heated and is made to foam. In this case, steamy conduction becomes certain through the 2nd opening formed near the other end of a Plastic solid, and the water of condensation is emitted.

[0015] As for the 2nd opening, preparing in a far side is desirable, in view of the 1st opening of a blow molding article. This is because it has the purpose for which the 2nd opening carries out conduction of the steam efficiently, and also performs discharge of the water of condensation. Thus, steamy conduction is performed efficiently and the water of condensation is discharged, because the temperature to which the fizz thermoplastics grain with which the interior of a blow molding object is filled up is made to fully foam is higher than the case of the general-purpose resin foam currently used conventionally.

[0016] In this process, in order to control the steamy emission within an activity ambient atmosphere and to prevent abnormality deformation of a blow molding object, a wrap fixture can be used for a blow molding object. This fixture is convenient in it being the structure which has a centrum equivalent to the appearance of request mold goods, and promotes emission of the steam from a Plastic solid, and/or the water of condensation further. In such a fixture, reducing the required pressure of the steam supplied from the outside by connecting an aspirator for steamy suction and making the inside of a fixture centrum into negative pressure a little, in order to ensure foaming, conduction of sufficient amount of steams is carried out.

[0017]

[Example] This invention is indicated referring to the attached drawing showing an example hereafter. the blow molding used as the envelope of the mold goods used for this invention — the polyphenylene ether system resin which denaturalized with styrene resin is chosen as heat resistant resin of the body and its function, and the blow molding object 1 as shows this to drawing 1 (A) with the usual blow molding machine is acquired. The 1st opening 2 and 2nd opening 3 are formed in this blow molding object 1 of shaping, coincidence, or post processing.

[0018] It is filled up with the fizz thermoplastics grain 5 to which pre-expansion of the polyphenylene ether system resin which denaturalized with styrene resin was carried out, and this is made to foam by the following approach in this centrum part as a high thermal-resistance fizz thermoplastics grain as well as a part for the centrum of this blow molding article.

[0019] In the 1st example of the approach concerning this invention, in order to spread a steam without nonuniformity in a Plastic solid centrum, the tubular object 4 which formed many stomata for steamy jet in the heat-resistant elasticity tube, for example, the tube of polytetrafluoroethylene (trade name: Teflon), and closed the tip is inserted into a Plastic solid centrum part from the 1st opening 2 like drawing 1 (B). It is filled up with the fizz thermoplastics grain 5 in a centrum like drawing 1 (C) after that. Then, a steam is made to blow off from this tubular object 4 for steamy jet.

[0020] The steam which could blow off from the jet hole of the tubular object 4, and was closed passes along the gap around the fizz nature thermoplastics grain 5, and it carries out sequential foaming, giving the amount of potential heat to a surrounding fizz thermoplastics grain.

[0021] In addition, since the steam which carries out conduction is emitted outside from the 2nd opening 3 prepared in mold goods, transfer of a lot of heat energy is performed by a lot of steams. Consequently, even if it is the fizz thermoplastics grain of high thermal resistance, you can make it fully foam. In addition, since temperature falls rapidly and a lot of water of condensation is generated, as for the steam from which heat was taken between foaming processings, it is desirable to emit from the 2nd opening 3 for steamy emission. Therefore, it is necessary to form this 2nd opening 3 under the blow molding object 1.

[0022] The hard tubular object 7 for many mold steamy jet which made two or more steamy jet nozzles 8 branch according to the structure of a blow molding article as the 2nd example of this invention as shown in drawing 2 when two or more openings for steamy impregnation were able to be formed can be used. In addition, if the tip of the tubular object 7 is formed acute, without preparing opening beforehand, it can thrust from the front face of the arbitration of a part with little appearance-like effect of a blow molding object, and a steam can also be supplied.

[0023] According to this configuration, after filling up a blow molding article with a fizz thermoplastics grain, two or more injection nozzles 8 are inserted in a Plastic solid, respectively, and heating preparation is completed. Then, the fizz thermoplastics grain of the blow molding inside of the body can be made to foam efficiently and certainly by being able to blow off and closing a steam. In this case, even if it is, it is necessary to prepare a steam and opening for discharge of the water of condensation in a blow molding object lower part like the 1st example.

[0024] In this invention, in order that the material of the blow molding object fabricated by blow molding and other approaches may acquire high rigidity also to the thermoplastics of high fizz with which it fills up in a centrum although what shows the high thermal resistance of 100 degrees C or more is adopted, an equivalent heat-resistant high thermoplastics particle is adopted. In order to make this fizz thermoplastics grain of high thermal resistance fully foam, it is necessary to heat it until it becomes a remarkable elevated temperature. However, if such hot heating is performed, it is begun to also soften the blow molding object as an envelope. Since the centrum of this fixture is

equivalent to the metal mold cavity at the time of blow molding object shaping even if it is in such a situation, the deformation which is not desirable as for a Plastic solid can be prevented.

[0025] Moreover, by forming a steamy suction means in such a fixture, discharge of the steam which performed heating for foaming is made easy, and it becomes possible to work with a comparatively low-pressure steam. Furthermore, the situation where the fizz thermoplastics grain under the effect of gravity becomes uneven is avoidable by rotating the whole fixture or adding the process of giving extraneous vibration.

[0026] This fixture is the configuration which can surround and contain the blow molding object 1 which consists of 2 fissions 13 and 14 which have the centruns 11 and 12 which are equivalent to the metal mold cavity which fabricated the Plastic solid concerned like drawing 3 , and is not illustrated by both. This fixture 10 is convenient when natural discharge or the aspirator 16 which can carry out forced discharge is formed for the steam and -, or the water of condensation discharged from the part 15 which does not bar the tubular object 4 for steamy supply to the blow molding object 1 shown in drawing 1 , and the 2nd opening 3.

[0027] As thermoplastics with a thermal resistance [in this invention] of 100 degrees C or more, the resin which denaturalized with engineering plastics and those polymer blends, such as conversion polyphenylene ether resin, polycarbonate resin, and thermoplastic polyester resin, can be used. A blow molding object can be formed for these resin etc. with blow molding, rotational casting, injection molding, etc.

[0028] It chose suitably from various above-mentioned materials, and the foaming agent of a request quantitative ratio was made to contain as a thermoplastics grain of high fizz with which the interior of a blow molding object is filled up. Although it can consider as the resin of a class suitably, for the so-called recycle which collects what was once used and is used again, it is desirable to adopt the material of a hollow envelope Plastic solid and the thing of a same system.

[0029]

[Effect of the Invention] The rigidity can be raised sharply, without sacrificing surface smoothness to the blow molding object used for the application which needs thermal resistance according to the Plastic solid by the manufacture approach of the blow molding object concerning this invention. Moreover, in a foaming process, the effectiveness that the welding of the wall of a blow molding object and a fizz thermoplastics grain is easy is acquired by adopting the thermoplastics of a same system as a blow molding object and a fizz thermoplastics grain.

[0030] The blow molding articles are collected after use, and a reuse (recycle) is easily more possible still for them as thermoplastics by the usual powder stylish processing.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the explanatory view showing the process of the manufacturing method of the blow molding article concerning this invention.

[Drawing 2] It is the explanatory view showing other examples of a configuration of the tubular object for steamy impregnation for enforcing the manufacturing method of the mold goods concerning this invention.

[Drawing 3] It is the explanatory view showing the example of a configuration of the fixture for enforcing the manufacturing method of the mold goods concerning this invention.

[Description of Notations]

1 Blow Molding Object

2 1st Opening

3 2nd Opening

4 Steamy Impregnation Tube (Elasticity Tubular Object)

5 Fizz Thermoplastics Grain

7 Many Mold Steamy Impregnation Branch Pipe (Hard Tubular Object)

8 Injection Nozzle

10 Fixture

16 Aspirator

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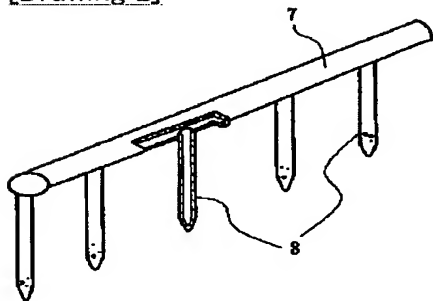
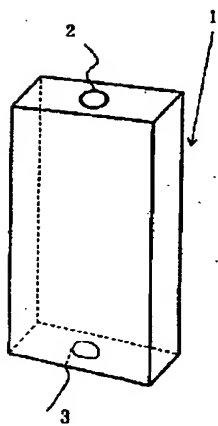
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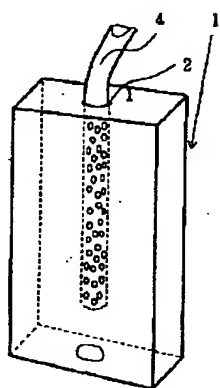
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DRAWINGS

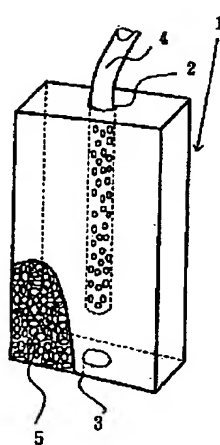
[Drawing 2]

[Drawing 1]
(A)

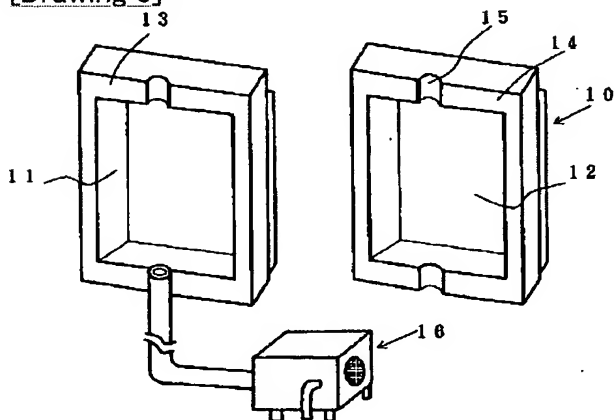
(B)



(C)



[Drawing 3]



[Translation done.]